REMARKS

Claims 1-10 are pending in the application and are at issue.

Prior to addressing the issues raised in the Office Action, applicants provide the following brief description of the invention. Superabsorbent polymers (SAP) are prepared by neutralizing a solution of acrylic acid from about 75 to about 100 mol% by adding sodium hydroxide, or a similar base, to an *aqueous solution* of acrylic acid. The neutralization is conducted *in situ* to provide a monomer solution having the desired weight percent of monomer at the desired mole % neutralization.

Because of the extremely high reactivity of unneutralized acrylic acid (AA), commercial AA contains a stabilizer to control premature polymerization. Unless removed from AA, the stabilizers are impart a color to SAPs. See English-language specification, page 1, lines 36-44.

Acrylic acid also dimerizes during storage, which presents a different problem. The AA dimer does not polymerize, but rather is present in the SAP hydrogel after polymerization. During process steps and/or storage, the dimer present in the SAP regenerates AA, which appears as residual AA in the final SAP product. Residual AA contributes the skin irritancy potential of an SAP. It also should be noted that other impurities present in commercial AA also are carried through the SAP production process and remain in the final SAP product.

In accordance with the present invention, applicants have found that the above problems

associated with SAPs can be avoided by adding *solid* sodium acrylate to the monomer solution used in the polymerization step. In particular, AA is neutralized with sodium hydroxide (or similar base) to provide an aqueous solution of sodium acrylate. The sodium acrylate then is precipitated from the aqueous solution by the addition of an alcohol, and is separated and dried to provide anhydrous sodium acrylate. The impurities found in acrylic acid, i.e., stabilizers, AA dimers, and other unidentified impurities, remain in solution and do not precipitate with the sodium acrylate.

The resulting *solid* sodium acrylate then is used in the polymerization reaction to produce an SAP hydrogel. The sodium acrylate can be anhydrous, if freshly prepared or protected from the atmosphere, or can contain from 0.1% to 10%, by weight, water because sodium acrylate is hydroscopic. Regardless, the sodium acrylate used to prepare the monomer solution is a *solid* and eliminates the above-described impurities found in AA for the polymerization process.

Using solid sodium acrylate in a polymerization process to provide an SAP hydrogel, as opposed to preparing the sodium acrylate *in situ*, yields an SAP of improved color and reduced residual monomer content. See, English-language specification, page 2, lines 1-4. The *solid* sodium acrylate utilized in the present invention is discussed in the English-language specification, page 2, line 14 through page 3, line 7.

In the Office Action, the specification is objected to for failing to provide a proper antecedent basis for the claimed subject matter. Applicants

traverse this objection. In Comparative Example 1, the sodium acrylate is prepared *in situ* by adding sodium hydroxide to a solution of AA. The amount of sodium acrylate in Comparative Example 1 therefore can be readily calculated by persons skilled in the art from the amounts of AA and 50% aqueous sodium hydroxide used in Comparative Example 1. In Inventive Example 1, it is clearly stated that "16.73 kg of solid sodium acrylate" was added to the solution. Persons skilled in the art can readily determine that the sodium acrylate used in Inventive Example 1 was anhydrous.

To illustrate, in Comparative Example 1, the monomer solution was prepared by mixing 14.24 kg 50 wt.% aqueous sodium hydroxide, 17.08 kg acrylic acid, and 28.68 kg water. During mixing acrylic acid was partially neutralized with 50% aqueous sodium hydroxide to form sodium acrylate (16.73 kg) and water (10.32 kg). Thus, the monomer solution contains 4.27 kg acrylic acid, 16.73 kg sodium acrylate (calculated as anhydrous sodium acrylate), and 39 kg water. Also, to be a comparative example, the monomer solution must have the same composition as the monomer solution used in the Inventive Example 1.

Therefore, a person skilled in the art would understand that the sodium acrylate of Inventive Example 1 is anhydrous sodium acrylate. This is the sole interpretation that would yield a monomer solution having the same composition as Comparative Example 1. Therefore, it is clear that solid sodium acrylate in Inventive Example 1 means solid anhydrous sodium acrylate, and the objection to the specification should be withdrawn.

Claims 6 and 7 stand rejected under 35 U.S.C. §112, first paragraph, as being nonenabling. Applicants traverse this rejection.

The examiner contends that the claimed subject matter was not described in the specification in such a way as to enable a person skilled in the art to practice the invention. Claims 6 and 7 are directed to using solid sodium acrylate that is anhydrous (claim 6) or contains 0.1% to 10%, by weight, water (claim 7). The specification clearly enables these claims.

The specification expressly discloses *solid* sodium acrylate at page 2, line 14 through page 3, line 7. As stated, sodium acrylate in the solid state initially is anhydrous, but is capable of absorbing moisture from the atmosphere such that the sodium acrylate can contain 0.1% to 10% water. See specification at page 2, lines 30-38. It is *not* important whether the solid sodium acrylate is anhydrous or contains 0.1% to 10%, by weight, water. In either case, the problems associated with providing sodium acrylate *in situ* are addressed and overcome. The *important* aspect of the inventors is recited in claim 1, i.e., the use of *solid* sodium acrylate in preparing the sodium acrylate polymer. The advantage, and importance, of using solid sodium acrylate is discussed in detail above.

It is clear that the specification contains sufficient information for a person skilled in the art to practice the claimed invention, i.e., the use of *solid* sodium acrylate in a process for preparing a sodium acrylate polymer. Accordingly, it is submitted

that the rejections of claims 6 and 7 under 35 U.S.C. §112, first paragraph, should be withdrawn.

Claim 1 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite because of the term "obtainable." Claim 1 has been amended to delete this term, and to clarify the claim by addition of the term "the." Accordingly, this rejection of claim 1 is now moot.

Claims 1-5 and 8-10 stand rejected under 35 U.S.C. §102(b) as being anticipated by Tsubakimoto et al. U.S. Patent No. 4,286,082 ('082). Claims 6 and 7 stand rejected under 35 U.S.C. §103 as being obvious over the '082 patent. For the reasons set forth below, it is submitted that these rejections are in error and should be withdrawn.

The '082 patent is directed to the standard prior art method of preparing an SAP. In particular, a *solution* of AA is partially neutralized with sodium hydroxide to provide a monomer solution containing sodium acrylate and unneutralized AA. The sodium acrylate is prepared *in situ* and is *not* added to the monomer solution as a solid, which is a recited *element* of each of the original and pending claims.

In particular, the '082 patent, at column 3, lines 20-22, states that the "acrylate salt monomer (B) used in the present invention is composed of 0 to 50 mol % of acrylic acid and 50 to 100 mol% of an alkali metal acrylate." The '082 patent does *not* disclose how this monomer (B) was produced. The examples of '082 further state that a *solution* of sodium acrylate and AA was used (e.g., Example 1, column 7, lines 32-38). The '082 patent contains *no* disclosure relating to using a

solid sodium acrylate as the source of a monomer in the preparation of an SAP.

Because the '082 patent fails to disclose every element recited in the present claims, the '082 patent cannot anticipate the claims 1-5 and 8-10 under 35 U.S.C. §102(b). It is further submitted that the present claims would not have been obvious over the '082 patent.

First, the '082 patent fails to teach or suggest using a *solid* sodium acrylate as a component to form a monomer solution. The '082 patent teaches the standard method of providing an alkali metal acrylate, i.e., an *in situ* neutralization of AA. Persons skilled in the art would not have been motivated to use solid sodium acrylate from the teachings of the '082 patent, which does not even consider or address any problems related to the source of the alkali metal acrylate, let alone any way to overcome these problems.

Second, the presently claimed invention provides unexpected results. As demonstrated by the examples in the specification, SAPs prepared according to the presently-claimed process contain less residual monomer and have an improved white color compared to SAPs prepared from an sodium acrylate prepared *in situ*. These unexpected results are based on using *solid* sodium acrylate, which has a reduced level of impurities. As disclosed in the specification (page 1, lines 9 to 17), solid sodium acrylate can be prepared by precipitation from methanolic solutions. Acrylic acid contains impurities that are removed by precipitation of solid sodium acrylate. The precipitation step acts as purification step, and the

precipitated solid sodium acrylate does not deteriorate on storing.

Persons skilled in the art, after reading the '082 patent, would have had no motivation or incentive to substitute a solid sodium acrylate for sodium acrylate prepared *in situ* with any reasonable expectation of achieving the new and unexpected results achieved by the presently claimed invention. The '082 patent simply provides no motivation for a person skilled in the art to vary from the standard procedure of generating sodium acrylate *in situ*, and absolutely provides no suggestion or hint that a change from this standard procedure would provide whiter SAPs having a reduced amount of residual monomers.

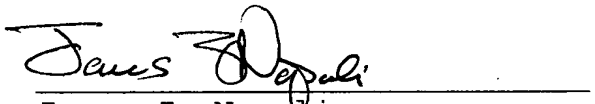
In summary, for the reasons set forth above, not only are the present claims novel over the '082 patent, but the present claims also would not have been obvious over the '082 patent under 35 U.S.C. §103. The cited reference simply does not teach, suggest, or even address, using a solid sodium acrylate in the preparation of an SAP.

It is submitted that the claims are in a proper form for allowance. An early and favorable action on the merits is requested.

Should the examiner wish to discuss the foregoing, or any matter of form in an effort to advance this application toward allowance, the examiner is urged to telephone the undersigned at the indicated number.

Respectfully submitted,

MARSHALL, GERSTEIN & BORUN LLP

By 

James J. Napoli
(Registration No. 32,361)
Attorneys for Applicants
6300 Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606
(312) 474-6300

Chicago, Illinois
March 24, 2006